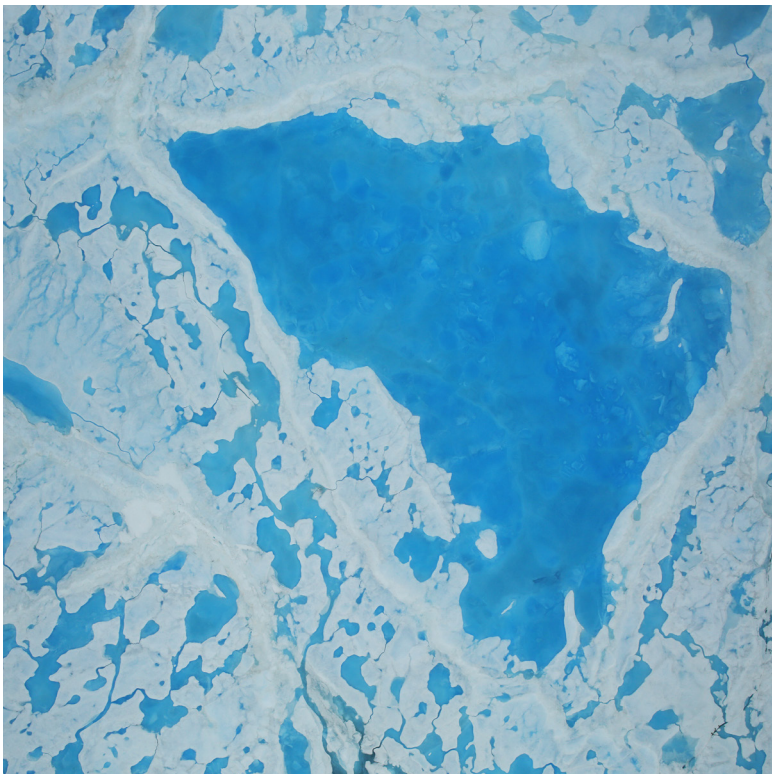

4 A LOOK AHEAD AT FY 2017

A LOOK AHEAD AT FY 2017

USGCRP interagency research priorities draw from the breadth of the Program's capabilities in observations, integrated modeling, process research, and actionable science to address emerging research opportunities and key scientific gaps and respond to critical decision-support needs. Extremes, thresholds and tipping points form an overarching and longer-term theme for USGCRP that includes building observational and modeling capabilities and theoretical understanding. Continuing as priorities from FY 2015 and 2016, nearer-term foci within this theme include Arctic Research and Resilience and Water-Cycle Extremes and their Impacts. Methane Cycling within the Carbon Cycle Framework is a new focal area for FY 2017, but reflects an area of ongoing Program interest, as seen in Highlights 29-30. This section provides a high-level outline of research objectives for the priority areas in FY 2017.

Arctic Research and Resilience

USGCRP aims to increase understanding of rapid Arctic environmental change and its implications for regional and global climate systems, as well as for societal risks and vulnerabilities in the region and worldwide. Under the auspices of the Arctic Executive Steering Committee, USGCRP is coordinating with other interagency groups (the Interagency Arctic Research Policy Committee, Subcommittee on Ocean Science and Technology, and U.S. Group on Earth Observations) to focus respective and collaborative efforts and leverage capabilities towards common goals. USGCRP's efforts within this arena include advancing Arctic observations, including field campaigns; contributing to assessments of Arctic adaptation and resilience; and improving understanding of the connections between Arctic change and global climate change. Enhanced understanding of the processes governing methane emissions in the Arctic, particularly as permafrost thaws, links USGCRP's Arctic and methane priorities.

NGEE-Arctic field research. (Source: DOE).

Water-Cycle Extremes and their Impacts

This priority area addresses knowledge gaps that limit the ability to understand and predict the interplay between climate change and the Earth's changing water cycle, and the interdependent human and natural systems that rely on water and, in turn, influence regional water cycles. It expands on the FY 2015 and 2016 water-cycle priority by developing capabilities to better assess and anticipate the ecological and societal impacts of water-cycle extremes on key sectors, such as energy, agriculture, infrastructure, and health. This priority aims to improve the U.S. Government's ability to predict and characterize, especially on decadal timescales, extreme events including droughts and extreme precipitation, and advance understanding of the relationships between global climate change and national- and regional-scale water-cycle characteristics.

FEMA's Urban Search and Rescue Teams go through neighborhoods with the National Guard to look for residents that may be stranded in a neighborhood that was flooded following Hurricane Matthew. (Source: Jocelyn Augustino, FEMA).

A Changing Carbon Cycle: Focus on Methane Cycling

Methane bubbles pop on the surface of a lake near Fairbanks, Alaska. Thawing permafrost in the lakebed soils releases old carbon, which microbes eat up and turn into methane. (Source: Kate Ramsayer, NASA).

USGCRP will spotlight its work on the carbon cycle over the next several years, with a FY 2017 focus on methane. This focus is intended to be supportive of, and complementary to, the "Strategy to Reduce Methane Emissions" announced in 2014 as part of the President's Climate Action Plan. Research objectives include enhancing understanding of processes governing methane emissions in key areas such as wetlands, the energy sector, agriculture and forestry, and oceans and permafrost regions as climate changes, and incorporating this understanding into climate models and projections of potential future releases and associated climate feedbacks. A major objective involves strength-

ening and expanding long-term monitoring efforts that are fundamental to understanding and modeling the interplay between atmospheric methane levels and methane sources from human activities and Earth's ecosystems, and that underlie needed improvements to estimates and predictions of methane emissions, inventories, radiative forcing, and attribution. On issues related to measurement and characterization of domestic anthropogenic methane emissions from all sectors, USGCRP will collaborate with the National Science and Technology Council's Methane Monitoring and Characterization Working Group. Other objectives include the improvement and utilization of climate models to simulate the evolving sources and sinks of methane and evaluate and project methane's climate effects and feedbacks.